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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/702,074	10/30/2000	Yi Liu	100969-147	9095
7590	12/04/2003		EXAMINER	
Iandiorio & Teska 260 Bear Hill Road Waltham, MA 02451-1018			MARTIR, LILYBETT	
			ART UNIT	PAPER NUMBER
			2855	

DATE MAILED: 12/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)
	09/702,074 Examiner Lilybett Martir	LIU, YI Art Unit 2855

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) Responsive to communication(s) filed on 29 August 2003.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) Claim(s) 1-11, 13, 14, 16 and 17 is/are pending in the application.
  - 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-11, 13, 14, 16 and 17 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

- 13) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
  - a) The translation of the foreign language provisional application has been received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ .
- 4) Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_ .
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: \_\_\_\_\_ .

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3-4, 8-10, 13 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sheen et al. (Pat. 4,598,593) in view of Donelan et al. (Pat. 4,003,256) and further in view of Lynnworth (Pat. 4,103,551).

- With respect to claim 1, Sheen et al. teaches a first transmitter receiver pair as in elements 20 and 21, a second transmitter receiver pair as in elements 22 and 23, a conduit as in element 41, and a processor as in elements 24-34 operative to correlate a tag-modulated output signal of the first and second pairs to determine a time interval representative of flow (Col. 2, lines 13-16 and Col. 3, lines 8-11 and 20-23). Sheen et al. fails to teach the second transmitter receiver pair being mounted so that the ultrasonic paths of both pairs are antiparallel. Donelan et al. teaches a flow rate-measuring device that comprises first and second pairs of transmitter receivers as in elements 13a, 14a, 13b and 14b where the second transmitter receiver pair being mounted so that the ultrasonic paths 15a and 15b of both pairs being antiparallel as noted in Figure 1 and of harmonic nature (Col. 2, lines 64-68 and Col. 3, lines 28-31).

Lynnworth teaches a flowmeter in which the clamp-on transducers 52 and 54 as shown in Figs. 3A-3D and 7A (Col. 8, lines 2-6). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the flowmetering device of Sheen et al. utilizing the teachings of the fluid monitoring device of Donelan et al. by specifically utilizing and arranging the transmitter receiver pairs so that their ultrasonic paths are antiparallel having an harmonic nature to therefore increase the flow metering device's measuring sensitivity and therefore make said device more reliable and accurate, and by further utilizing the teachings of the ultrasonic measuring system of Lynnworth by utilizing clamp-on units to therefore make said device simple, reliable and highly sensible.

- With respect to claim 3, Sheen et al. teaches operating in a frequency range above 100KHz (Col. 3, lines 32-35).
- With respect to claim 4, Sheen et al. teaches operating in a frequency range above and approximately 900KHz (Col. 3, lines 32-35, note that a frequency of 1MHz is a value that is very close to 900KHz).
- With respect to claims 8 and 13, Sheen et al. teaches a first transmitter receiver pair as in elements 20 and 21, a second transmitter receiver pair as in elements 22 and 23, a conduit as in element 41 and a processor as in elements 24-34 operative to correlate a tag-modulated output signal of the first and second pairs to determine a time interval representative of

flow (Col. 2, lines 13-16 and Col. 3, lines 8-11 and 20-23), and a correlator as in element 34 operative to determine a time interval representative of flow (Col. 2, lines 13-16 and Col. 3, lines 8-11 and 20-23). Sheen et al. fails to teach the second transmitter receiver pair being mounted so that the ultrasonic paths of both pairs are antiparallel. Donelan et al. teaches a flow rate-measuring device that comprises first and second pairs of transmitter receivers as in elements 13a, 14a, 13b and 14b where the second transmitter receiver pair being mounted so that the ultrasonic paths 15a and 15b of both pairs being antiparallel as noted in Figure 1 and of harmonic nature (Col. 2, lines 64-68 and Col. 3, lines 28-31). Lynnworth teaches a flowmeter in which the clamp-on transducers 52 and 54 as shown in Figs. 3A-3D and 7A(Col. 8, lines 2-6). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the flow metering device of Sheen et al. utilizing the teachings of the fluid monitoring device of Donelan et al. by specifically utilizing and arranging the transmitter receiver pairs so that their ultrasonic paths are antiparallel having an harmonic nature to therefore increase the flow metering device's measuring sensitivity and therefore make said device more reliable and accurate, and by further utilizing the teachings of the ultrasonic measuring system of Lynnworth by utilizing clamp-on units to therefore make said device simple, reliable and highly sensible.

- With respect to claims 9 and 10, Sheen et al. fails to specifically intend to utilize their flow metering devices in either a steam pipe of a building heating system or a process feed gas pipe of a chemical plant. Both Sheen et al. (Col. 2, lines 28-31) and Donelan et al. teach the utilization of their metering devices in flow paths, conduits or pipes. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations (Ex Parte Masham, 2 USPQ F.2d 1647 (1987)). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the flowmetering device of Sheen et al. by utilizing said flow metering means in diverse systems and pipes/conduits to make said means versatile.
- With respect to claim 16, Sheen et al. teaches the utilization of ultrasonic paths perpendicular to the axis of the conduit 14 (Note the arrow → which indicates both the direction of the flow and the axis of the conduit, and how the T and R are arranged with respect to the →).
- With respect to claim 17, Sheen et al. fails to teach the utilization of ultrasonic paths oblique to the axis of the conduit. Lynworth teaches the utilization of ultrasonic paths oblique to the axis of the conduit as noted in Figure 4A and 4B (Col. 10, lines 17-19). It would have been obvious at the time the invention was made to a person having ordinary skill in the

art to modify the flowmetering device of Sheen et al. as modified by Donelan et al. and further utilizing the teachings of the ultrasonic measuring system of Lynnworth by utilizing of ultrasonic paths oblique to the axis of the conduit to therefore make said device versatile, accurate, reliable and highly sensible.

3. Claims 2,5-6, 11 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sheen et al. in view of Donelan et al. and Lynnworth as applied to claims 1 and 13 above, and further in view of Bruner (Pat. 4,528,857).

- With respect to claim 2, Sheen et al. fails to teach specifically utilizing a different frequency of operation for each pair of transmitter receivers. Bruner teaches an ultrasonic flowmeter where first and second pairs of transmitter receivers as in elements 24,26, 28 and 30 work at different frequencies (Col. 2, lines 31-38). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the flow metering device of Sheen et al. by utilizing different frequencies of operation in both transmitters as taught by Bruner to prevent cross talk and therefore increase the reliability of a flow-metering device.
- With respect to claim 5, Sheen et al. fails to teach specifically utilizing a different frequency of operation for each pair of transmitter receivers and received signals are demodulated at their transmission frequency. Bruner teaches an ultrasonic flowmeter where first and second pairs of

transmitter receivers as in elements 24,26, 28 and 30 work at different frequencies where the received signals are demodulated (Col. 2, lines 31-38). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the flowmetering device of Sheen et al. by utilizing demodulation as taught by Bruner to prevent cross talk and therefore increase the reliability of a flow-metering device.

- With respect to claim 6, Sheen et al. fails to teach the utilization of a frequency of operation in the first pair that is approximately ten percent of the frequency of operation of the second pair. Bruner teaches an ultrasonic flowmeter where first and second pairs of transmitter receivers as in elements 24,26, 28 and 30 work at different frequencies (Col. 2, lines 31-38). Since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art (*In re Aller*, 105 USPQ 233), It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the flow metering device of Sheen et al. by utilizing different frequencies of operation in both transmitters as taught by Bruner to prevent cross talk and therefore increase the reliability of a flow-metering device.

- With respect to claim 11, Sheen et al. fails to teach the utilization and attachment of the flow metering device to a pipe or conduit having a diameter of about under two inches. Bruner teaches that it is well known

- in the art to utilize flow meters in a wide range of conduit sizes (Col. 2, lines 20-24). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the flow-metering device of Sheen et al. by securing a flow-metering device to a small conduit to make a device versatile and therefore capable of making measurements in smaller conduits that occupy smaller places.
- With respect to claim 14, Sheen et al. fails to teach specifically utilizing a different frequency of operation for each pair of transmitter receivers and received signals are demodulated at their transmission frequency. Bruner teaches an ultrasonic flowmeter where first and second pairs of transmitter receivers as in elements 24,26, 28 and 30 work at different frequencies where the received signals are demodulated (Col. 2, lines 31-38). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the flowmetering device of Sheen et al. by utilizing different frequencies of operation in both transmitters to prevent cross talk and therefore increase the reliability of a flow-metering device and it's utilization.
4. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sheen et al. in view of Donelan et al., Lynnworth and Bruner as applied to claims 5,13 and 18 above, and further in view of Itoh et al. (Pat. 5,503,035).
- With respect to claim 7, Sheen et al. fails to specifically teach the utilization of a continuous mode. Itoh et al. teaches a flow-metering

device where the utilization of continuous waves is stated as known in the art (Col. 8, lines 55-57). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the flow metering device of Sheen et al. utilizing the teachings of Itoh et al. by operating it in a continuous mode to therefore increase the efficiency accuracy and reliability of a metering device by making continuous and multiple flow measurements.

***Response to Arguments***

5. Applicants amendments raised new issues that made necessary the new art to be applied and therefore, the arguments presented against Sheen et al. in view of Donelan et al. are said to be moot due to the new grounds of rejection. Applicant's arguments have been fully addressed by the above-presented rejection.

6. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the argument and reasons why the references cannot be combined given by the applicant regarding the reduction of cross talk is not persuasive since the term "cross talk" was never included as part of the claim language. In response to applicant's arguments against the

references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

***Conclusion***

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).
8. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.
9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lilybett Martir whose telephone number is (703)305-6900. The examiner can normally be reached on 9:00 AM to 5:30 PM.
10. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (703)305-4816. The fax phone

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number for the organization where this application or proceeding is assigned is  
(703)305-3432.

11. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

  
Lilybett Martir  
Examiner  
Art Unit 2855

  
Edward Lefkowitz  
Supervisory Patent Examiner  
Technology Center 2800